

What is claimed is:

1 1. A computer assisted method comprising:  
2 measuring activity of one or more internal voxels of a brain;  
3 employing computer executable logic that takes the measured brain activity and  
4 determines one or more members of the group consisting of: a) what next stimulus to  
5 communicate to the subject, b) what next behavior to instruct the subject to perform, c)  
6 when a subject is to be exposed to a next stimulus, d) when the subject is to perform a  
7 next behavior, e) one or more activity metrics computed from the measured activity, f)  
8 a spatial pattern computed from the measured activity, g) a location of a region of  
9 interest computed from the measured activity, h) performance targets that a subject is  
10 to achieve computed from the measured activity, i) a performance measure of a  
11 subject's success computed from the measured activity, j) a subject's position relative  
12 to an activity measurement instrument; and  
13 communicating information based on the determinations to the subject in  
14 substantially real time relative to when the activity is measured.

1 2. A method according to claim 1 wherein measuring brain activity is performed  
2 by fMRI.

1 3. A method according to claim 1 wherein the determinations are made in less than  
2 10 seconds relative to when the activity is measured.

1 4. A method according to claim 1 wherein the determinations are made in less than  
2 1 second relative to when the activity is measured.

1 5. A method according to claim 1 wherein the determinations are made in less than  
2 0.5 second relative to when the activity is measured.



4 nucleus raphe dorsalis, nucleus basalis of Meynert, dorsolateral pre-frontal cortex,  
5 anterior pre-frontal cortex.

1 14. A method according to claim 12 wherein the region of interest has a primary  
2 function of releasing a neuromodulatory substance, where the neuromodulatory  
3 substance is selected from the group consisting of: dopamine, acetyl choline,  
4 noradrenaline, serotonin, an endogenous opiate.

1 15. A method according to claim 12 wherein the subject has one or more of the  
2 following conditions: Parkinson's disease, Alzheimer's disease, attention & attention  
3 deficit disorder, depression, substance abuse & addiction, schizophrenia.

1 16. A method according to claim 1 wherein the information is communicated by a  
2 manner selected from the group consisting of providing audio to the subject, providing  
3 tactile stimuli to the subject, providing a smell to the subject, displaying an image to the  
4 subject.

1 17. A method according to claim 1 wherein the information communicated is an  
2 instruction to the subject.

1 18. A method according to claim 17 wherein the instruction is a text or iconic  
2 indication denoting an action that a subject is to perform.

1 19. A method according to claim 17 wherein the instruction identifies a task to be  
2 performed by the subject.

1 20. A method according to claim 17 wherein the instruction is determined by  
2 computer executable logic.

1 21. A method according to claim 20 wherein the instruction communicated is  
2 selected from a set of instructions stored in memory, the selection being based upon the  
3 brain activity measured.

1 22. A method according to claim 1 wherein some of the information communicated  
2 to the subject is material to be learned.

1 23. Computer executable software for guiding brain activity training comprising:  
2 logic which takes data corresponding to activity measurements of one or more  
3 internal voxels of a brain and determines one or more members of the group consisting  
4 of: a) what next stimulus to communicate to the subject, b) what next behavior to  
5 instruct the subject to perform, c) when a subject is to be exposed to a next stimulus, d)  
6 when the subject is to perform a next behavior, e) one or more activity metrics  
7 computed from the measured activity, f) a spatial pattern computed from the measured  
8 activity, g) a location of a region of interest computed from the measured activity, h)  
9 performance targets that a subject is to achieve computed from the measured activity,  
10 i) a performance measure of a subject's success computed from the measured activity,  
11 j) a subject's position relative to an activity measurement instrument; and  
12 logic for communicating information based on the determinations to the subject  
13 in substantially real time relative to when the activity is measured.

1 24. Software according to claim 23 wherein the software performs the  
2 determinations in less than 10 seconds relative to when the brain activity measurement  
3 is taken.

1 25. A method comprising:  
2 (a) measuring activity of one or more internal voxels of a brain;  
3 (b) communicating instructions to a subject derived from that measured activity

4 in substantially real time relative to when the behavior is performed; and  
5 (c) having the subject perform a behavior in response to receiving the  
6 instructions.

1 26. A method according to claim 25 wherein measuring brain activity is performed  
2 by fMRI.

1 27. A method according to claim 25 wherein measurements are made from at least  
2 100 separate voxels.

1 28. A method according to claim 25 wherein the instructions are derived through  
2 a computer executable logic process of selecting from a set of possible instructions  
3 based upon the brain activity measured.

1 29. A method according to claim 29, wherein computer executable logic is employed  
2 to cause the information to be communicated to the subject.

1 30. Computer executable software, the software comprising:  
2 logic for taking activity measurements of one or more localized brain regions  
3 as a behavior is performed; and  
4 logic for communicating information to the subject based on the measured brain  
5 activity in substantially real time relative to when the behavior is performed;  
6 wherein the logic takes new activity measurements as they are received and  
7 communicates new information based on the new activity measurements.